CLAIMS

1. A thermal energy distribution system for supplying several buildings with thermal service **characterized by**

at least two of said buildings being fully detached from each other, and in that said system comprises:

a branching station;

several conduits each forming an essentially unbroken connection from said branching station to a thermal connection in or close to each said building, each conduit being flexible and having essentially the same cross-section over the entire length hereof, and

at least two of said conduits extending essentially adjacent to each other over a first portion (CONa), and extending to each building over a third portion (CONc) and having a second portion (CONb) forming a transition between said first and third portion.

2. The system of claim 1, **characterized in that** at least one group of said first portions (CONa) of said conduits extend within or along a street.

3. The system of claims 1 or 2, **characterized in that** said conduits are essentially thermally un-insulated, thermal insulation being arranged around said conduits.

4. The system of claims 1 or 2, **characterized in that** said conduits comprise thermal insulation being arranged as at least one part of said conduits.

5. The system of any of the preceding claims **characterized in that** at least one of said conduit is made with one or more channels for leading fluid flow, said channel(s) being formed within said conduit that is either fully polymeric or mainly

polymeric, in the latter case being provided with at least one metallic membrane arranged to prevent gas diffusion across a said pipe.

6. The system of any of the preceding claims **characterized in that** at least one said conduit is made with one or more channels for leading fluid flow, said channel(s) being formed within said conduit that is either fully metallic or mainly metallic, in the latter case with one or more polymeric layers on the inside and / or on the outside of the metallic part, the metallic part providing the main mechanical strength of said conduit.

7. The system of claim 5 **characterized in that** said at least one conduit is prefabricated in the form of an integrated polymeric structure being fabricated from the same base material and in a simultaneous manufacturing process.

8. The system of any of the preceding claims **characterized in that** the outer shape of said conduits is circular.

9. The system of any of claims 1 to 7 **characterized in that** the outer shape of said conduits is square, rectangular, or hexagonal, whereby voids between of the conduits can be minimized when they are arranged adjacent to each other.

10. The system of any of the preceding claims **characterized in that** said transitional portions (CONb) of said conduits are curved with a minimal radius of curvature that is at least 10 times the cross-sectional size of said conduit, taken in the direction of said radius, said size in the case of a circular shape of said conduit being the diameter of said conduit.

11. The system of claim 10, **characterized in that** said radius of curvature is instead less than ten times said cross-sectional size.

12. The system of any of the preceding claims **characterized in that** said first portion (CONa) of said adjacent conduits being arranged within a casing.

13. The system of claim 12 **characterized in that** said casing is formed mainly by blocks of insulating material.

14. The system of claim 13 **characterized in that** said insulation blocks are made of a polymeric material to form either of the following material structures:

a permeable structure made up of coherent, small elements, or

an impermeable, relatively stiff structure of mainly closed cells, or

an impermeable, relatively flexible structure of mainly closed cells,

such that either all said blocks are formed to the be of the same type of structure, or there is a combination of blocks made of differing structures.

15. The system of claims 13 or 14 **characterized in that** at least one part of said conduits is arranged within grooves made either directly as parts of said blocks or by addition of further system elements.

16. The system of any claims 13, 14, or 15 **characterized in that** said second portions (CONb) of conduits are either inserted into curved parts of said grooves according to claim 15 or are inserted into supportive structures that lead said conduits along predetermined curves.

17. The system of claim 16 **characterized in that** said second portions (CONb) of said conduits, when being arranged to be curved, are arranged within a

structure provided with a solid boundary that allows for some deformation of the cross-section of the conduit, but prevents deformation beyond a certain, predetermined limit in order that local over-deformation that may compromise the structure of the conduit can be avoided.

18. The system **of** any of the preceding claims **characterized in that** thermal insulation of said conduits is made in the form of super-insulation comprising a vacuum between either gas impermeable foils and/or grains and/or open-celled insulation material contained within a structure that is substantially gas-tight towards the surroundings, said vacuum to be established, either prior to said conduits being arranged underground or afterwards, said structure either being of such stability that a vacuum can be maintained for at least five years without any additional measures, or said vacuum to be intermittently re-established and/or continuously upheld by having a vacuum pump in connection with said vacuum, and/or said vacuum to be continuously upheld by having a getter material being distributed throughout said vacuum, thereby removing from the vacuum molecules that will tend to otherwise degrade said vacuum.

19. The system of any of the preceding claims **characterized in that** buildings are connected to a forward line of said conduits, leading fluid flow to said building and a return line leading fluid flow from said building.

20. The system of claim 19 **characterized in that** said buildings are additionally connected by at least one further line of said conduits, leading hot service water to a said building, said hot water being

prepared commonly for supply to all said buildings connected to a said branching station.

21. The system of claim 20 **characterized in that** said system is provided with circulation of hot service water taking place within at least two said lines for each said building, and that in at least one said line the flow can be reversed to temporarily flow in the opposite direction of re-circulation, i.e. to said building instead of from said building.

22. The system of claims 20 or 21 **characterized in that** four or more lines of fluid flow flowing in said conduits are connected to the said buildings.

23. The system according to any of the preceding claims **charaterized in that** building heating and / or cooling systems of said buildings are connected directly to said conduits, i.e. without heat exchangers for hydraulical separation.

24. The system of claim 23 **characterized in that** said branching station comprises a fluid flow leakage detecting system and valves for closing a hydraulical loop for transferring one or more fluids into a building heating and / or cooling system in case of a leakage of said loop being detected.

25. The system of any of the preceding claims **characterized in that** heat metering for accounting for the amount(s) of thermal supply to each building is made inside or adjacent to a said branching station.

26. The system of any of the preceding claims **characterized in that** one or more hydraulical lines leading fluid flow to said branching station is provided with a turbine that can supply mechanical energy and/or electrical energy to at least one pump and/or control equipment and/or metering equipment and/or further units, all arranged within or adjacent

to a said branching station, said electrical energy, when provided for, being generated in a dynamo driven by said turbine.

27. The system of any of the preceding claims **characterized in that** said flexible conduits are supplied to a building site mounted on one or more rolls.

28. The system according to any of the preceding claims **characterized in that** said conduits, being flexible, when arranged underground are rolled out from at least one movable roll being part of said apparatus, such that the part of at least one said conduit being arranged at a given moment is situated relatively close to said at least one roll.

29. The system according to claim 28 **characterized in that** said at least one roll is adapted to be supplemented by one or more tools for arranging said conduits precisely into their final, intended positions underground.

30. The system according to claim 29 **characterized in that** a group of said conduit first portions (CONa) are rolled out simultaneously from a single said roll.

31. The system according to any of claims 28, 29, or 30 **characterized in that** said conduits, when being rolled out have been heated to and/or maintained at a material temperature of said conduit that is at least room temperature, i.e. at least around 20 degrees Centigrade.

32. A method for constructing a thermal energy distribution system according to claim 1, for supplying several buildings with thermal service, wherein at least two of said buildings being fully detached from each other, said system comprising a branching station; said method being **characterized by**

arranging several conduits each forming an essentially unbroken connection from said branching station to a thermal connection in or close to each said building, each conduit being flexible and having essentially the same cross-section over the entire length hereof, and

arranging at least two of said conduits for extending essentially adjacent to each other over a first portion (CONa), and extending to each building over a third portion (CONc) and having a second portion (CONb) forming a transition between said first and third portion

33. The method of arranging said conduits according to claim 32 claims **characterized in that** said transitional conduit portions (CONb), when being bent are heated to attain a material temperature of the said portion that is at least room temperature, i.e. at least around 20 degrees Centigrade.

34. The method of claim 32 or 33, **characterized by** arranging at least one group of said first portions (CONa) of said conduits for extending within or along a street.